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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,146	03/10/2004	Mizuhisa Nihei	040102	2043
23850 7590 12/13/2007 KRATZ, QUINTOS & HANSON, LLP 1420 K Street, N.W. Suite 400 WASHINGTON, DC 20005			EXAMINER PHAM, THANHHA S	
			ART UNIT 2813	PAPER NUMBER
			MAIL DATE 12/13/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/796,146	<b>Applicant(s)</b> NIHEI ET AL.	
	<b>Examiner</b> Thanhha Pham	<b>Art Unit</b> 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 21-32 is/are pending in the application.
- 4a) Of the above claim(s) 11-17 and 21-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 7-10 and 30-32 is/are rejected.
- 7) ☒ Claim(s) 2-6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

This Office Action is in response to Applicant Amendment dated 09/18/2007.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. **Claims 7-10 and 31-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

- ▶ With respect to claim 7,

line 2, the limitation "a first and a second upper surface" renders the claim indefinite. It is not clear what "a first and a second upper surface" means. It is not clear how a first surface is defined – a first upper surface being the same side with the second upper surface? Applicant is respectfully suggest to clarify and use appropriate better claimed language.

- ▶ With respect to claim 9,

Limitation "the second surface" lacks antecedent basic.

- ▶ With respect to claim 10,

line 2, the limitation "a first and a second upper surface" renders the claim indefinite. It is not clear what "a first and a second upper surface" means. It is not clear how a first surface is defined – a first upper surface being the same side

with the second upper surface? Applicant is respectfully suggest to clarify and use appropriate better claimed language.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**1. Claims 1, 7, 8 and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chen [US 6,191,478].**

► With respect to claim 1, Chen (fig 5 & 8, cols 1-8) discloses the claimed semiconductor device comprising:

a SiC substrate (25, silicon carbide, col 5 lines 15-21); and

a heat conductor (33, col 5 lines 4-38) formed in a first hole (27) in the SiC substrate and made of linear structure of carbon elements (carbon fiber) inherently oriented in a depth direction of the first hole wherein the linear structure of carbon elements is a bundle of carbon nanotubes (carbon fibers in the first hole would oriented in a depth direction of the first hole and is a bundle of carbon nanotubes) ,

wherein a diameter of the heat conductor is the same as a diameter of the first hole.

► With respect to claim 7, Chen (fig 5, 7 & 8, cols 1-8) discloses the claimed semiconductor device comprising:

Art Unit: 2813

a SiC substrate (25, silicon carbide, col 5 lines 15-21) having a first surface upper surface and a second upper surface;

a first heat conductor (33a, col 5 lines 4-38) formed in a first hole (27a, col 8 lines 38-55) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber);

a second heat conductor (33b, col 5 lines 4-38) formed in a second hole (27b) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber) inherently oriented in a depth direction of the second hole wherein the linear structure of carbon elements is a bundle of carbon nanotubes (carbon fibers in the first hole would oriented in a depth direction of the first hole and is a bundle of carbon nanotubes) ; and

an element (61, fig 7) formed on the second surface of the SiC substrate,

wherein a diameter of the first heat conductor is the same as a diameter of the first hole and a diameter of the second heat conductor is the same as a diameter of the second hole.

► With respect to claim 8, the claimed distance from the second upper surface of the SiC substrate to an upper surface of the second heat conductor relative (longer) to a distance from the second upper surface of the SiC substrate to an upper surface of the first heat conductor would have been obvious to an ordinary artisan practicing the invention because, absent evidence of disclosure of criticality for the range giving unexpected results, it is not inventive to discover optimal or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

Furthermore, it appears that these changes produce no functional differences and therefore would have been obvious. See *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

► With respect to claim 10, Chen (fig 5, 7 & 8, cols 1-8) discloses the claimed semiconductor device comprising:

a SiC substrate (25, silicon carbide, col 5 lines 15-21) having a first upper surface (the surface of the substrate 25 that defines hole 27b -- wall and bottom of hole 27b) and a second upper surface;

a first heat conductor (33a, col 5 lines 4-38) formed in a hole (27a, col 8 lines 38-55) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber) inherently oriented in a depth direction of the hole wherein the linear structure of carbon elements is a bundle of carbon nanotubes (carbon fibers in the first hole would oriented in a depth direction of the hole and is a bundle of carbon nanotubes) ;

a second heat conductor (33b, col 5 lines 4-38) formed to cover the upper first surface of the SiC substrate entirely (*second heat conductor 33b filling hole 27b would inherently entirely cover the first surface since the first surface of the substrate 25 is the surface that define the hole 27b*) in the first surface of the SiC substrate and made of linear structure of carbon elements (carbon fiber) oriented in a depth direction of the hole; and

an element (61, fig 7) formed on the second upper surface of the SiC substrate, wherein a diameter of the first heat conductor is the same as a diameter of the hole.

***Allowable Subject Matter***

2. Claim 2-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

3. Applicant's arguments with respect to claims 1, 7-10 and 30-32 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

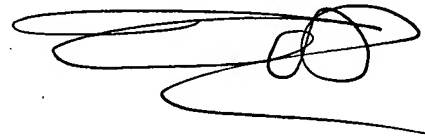
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TSP

A handwritten signature in dark ink, consisting of several loops and a long horizontal stroke at the end.

THANHHA S. PHAM  
PRIMARY EXAMINER